2008-10-23 Thursday Pbar Notes

Wednesday, October 22, 2008
8:33 PM

Access

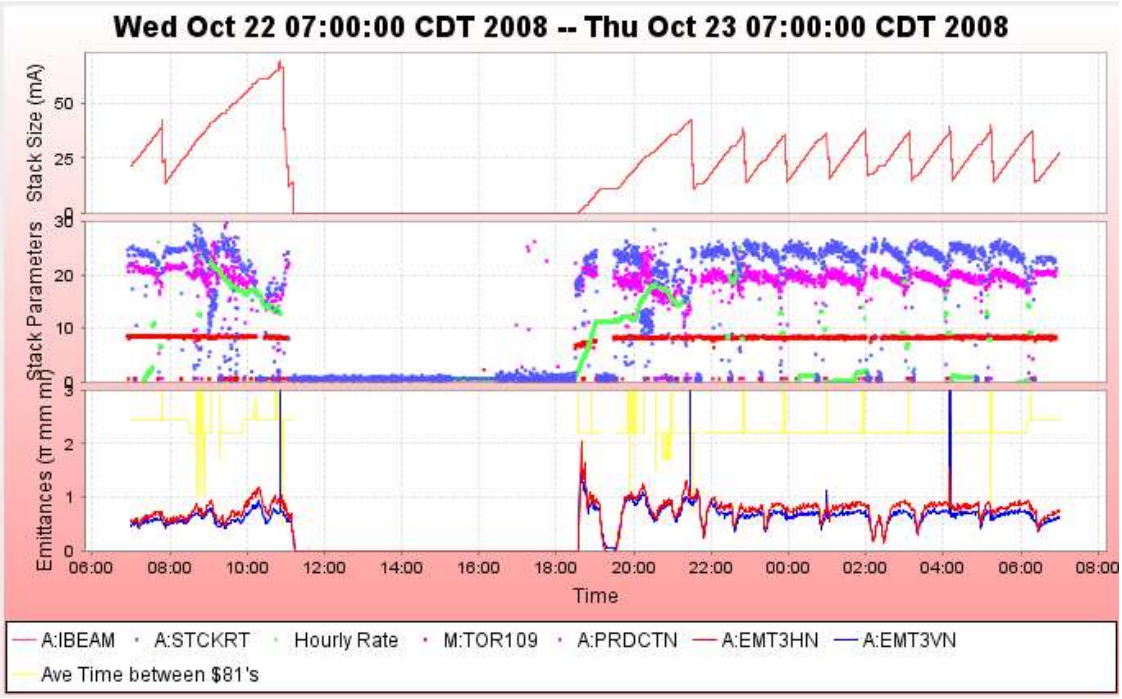
- Access during the LRF3 driven downtime.

Pbar			
ID	Type	Title	Crew
8879	Misc	Inspection of Pbar Rings. Found a dripper on D4SD13. Thermal scan of magnets (results listed above).	Jim Morgan, Brian Drendel
9150	High Level RF	Replace DRF1-2 Thermocouple Chassis.	Pete Seifrid, Wes Mueller
9161	Stochastic Cooling	Core Betatron Vertical: Install new .085 flex lines between the coupler and isolator at the front end of the medium level plate for bands #1, #2, & #3	Pete Seifrid, Wes Mueller

- Also, FESS turned on LP6 and turned off LP7.

Stacking

- After the access, stacking was re-established.
- Transfer Function measurements were made on the Core Vertical system. The data from these measurements is being analyzed to come up with a new calculated trombone settings. This will likely be done today and could be put in transparently. Due to significant band overlap, the best settings may be different than the best individual settings for each band.
- On the evening shift, we turned up stacking.
  - Fixed the Stacktail Filter #3 position after the Fridge stabilized following the owl shift dry engine repairs.
  - Tuned up Core Vertical as best as we could without
- Performance Numbers
  - Most in an hour: 22.88 mA at Wed Oct 22 08:57:32 CDT 2008
  - Average Production 17.41 e-6/proton
  - Pbars stacked: 301.06 E10 in 16.15 hours of stacking.
  - We are still down in stack rate and production as we sort out our stochastic cooling issues.



Transfers

- Unstacked 295.2mA in 23 transfers over 11 sets.
  - Accumulator to MI Efficiency was 96%
  - Accumulator to RR Efficiency was 94%
- Both numbers are down, partially due to Accumulator emittances.

Column 1 Number_0_Pbar	Column 4 Number_3_Transfer Time		Column 21 Number_20_A:IB	Unstacked (mA)	Column 24 Number_23_R:BE	Stashed	Acc to RR Eff	Column 27 Number_26_MI DCCT SMALL	Column 28 Number_27_MI Before	Acc to MI Eff	Acc to MI2 Eff	Transfers	Sets
	Totals =>	7:00:00 AM		295.18		277.75	94.09%	285.21	285.03	96.62%	96.56%	23	11
9710	Thursday, October 23, 2008	6:18:20 AM	36.96	24.33	205.63	22.99	94.49%	23.37	23.25	96.08%	95.60%	2	1
9709	Thursday, October 23, 2008	5:15:33 AM	36.53	23.42	183.04	22.21	94.84%	22.73	22.79	97.05%	97.32%	2	1
9708	Thursday, October 23, 2008	4:11:17 AM	36.52	22.67	161.16	21.29	93.87%	21.87	21.58	96.44%	95.18%	2	1
9707	Thursday, October 23, 2008	3:07:35 AM	36.40	22.82	140.14	21.56	94.48%	21.83	22.12	95.63%	96.90%	2	1
9706	Thursday, October 23, 2008	1:59:40 AM	37.33	21.52	118.88	20.17	93.74%	20.64	20.83	95.93%	96.81%	2	1
9705	Thursday, October 23, 2008	12:59:28 AM	36.21	21.97	98.84	20.77	94.56%	21.34	20.94	97.15%	95.34%	2	1
9704	Wednesday, October 22, 2008	11:54:18 PM	35.05	22.14	78.26	21.06	95.10%	21.49	21.29	97.04%	96.15%	2	1
9703	Wednesday, October 22, 2008	10:51:30 PM	35.33	22.69	57.36	21.55	95.01%	21.92	22.31	96.64%	98.32%	2	1
9702	Wednesday, October 22, 2008	9:29:03 PM	41.55	31.71	35.94	29.38	92.63%	30.74	30.60	96.94%	96.48%	2	1
9701	Wednesday, October 22, 2008	10:57:09 AM	65.66	55.50	360.98	51.74	93.24%	54.05	54.00	97.40%	97.31%	3	1
9700	Wednesday, October 22, 2008	7:49:33 AM	38.75	26.41	312.58	25.03	94.75%	25.23	25.31	95.51%	95.82%	2	1

Studies

Requests

1. **Put in new optimal Core Vertical Cooling Settings**
   - Based on last nights TFM, we will put the new settings in place.
   - This can be done transparently while stacking.
2. **Core Transverse Cooling Measurements**
   - Beam conditions:

- ~45mA of beam in the Accumulator.
- Background
  - This is a repeat of the core cooling study completed first on the evening of Friday, October 3rd (See http://www-bd.fnal.gov/cgi-mach/machlog.pl?nb=pbar08&action=view&page=423&anchor=202716&hilite=20:27:16-), and then again on the morning of Friday, October 17th (http://www-bd.fnal.gov/cgi-mach/machlog.pl?nb=pbar08&action=view&page=441&load=).
  - The October 3rd set of measurements were taken before the Core Vertical Equalizer was installed.
  - The October 17th set of measurements were taken after the Core Vertical Equalizer was installed. Initial indications are that maybe the cooling is worse with the new vertical equalizer.
  - Transfer function measurements made on October 13th (http://www-bd.fnal.gov/cgi-mach/machlog.pl?nb=pbar08&action=view&page=433&anchor=135730&hilite=13:57:30-) determined that the trombone for each band needed to go longer by one wavelength; however, band 2 did not have enough range. This means the measurements taken on October 17th were not with a completely optimized system.
  - Adding additional cable delay requires a tunnel access, which was completed on Wedensday, October 22nd (http://www-bd.fnal.gov/cgi-mach/machlog.pl?nb=pbar08&action=view&page=451&scroll=false&load=).
  - This study repeats core cooling measurements made on October 3rd and 17th, with the new equalizer in place, with the appropriate cable delays to properly tune the trombones.
- The study
  - The studier is Jim Morgan
  - The estimated time is 2+ hours.
  - The study involves blowing the beam up and cooling it back down for each core vertical cooling band.

3. **Static Stacktail Measurements**.
   - Conditions:
     - This study should be started directly before a set of transfers to Recycler. We want a 30mA stack.
     - Prior to the start of this study, we would like five supercycles of stacking without SY120 or Studies events in the TLG. This will allow setup the stacktail in a known condition for the study.
   - The Study:
     - A Numi-only TLG is loaded
     - The studier is Dave Vander Meulen
     - The estimated study time is 20 minutes.
   - After the study is complete, we can transfer to the Recycler.
   - Leave > 10mA of beam behind for the next study.
4. **Stacktail Transfer Function Measurements:**
   - Conditions:
     - This study will start with 10mA leftover after a set of transfers.
   - The Study
     - The studiers are Steve Werkema and Ralph Pasquinelli.
     - The estimated study time is 4 hours.
     - If beam is lost during any of the measurements, we need to be able to stack for short periods of time to replace the beam for the next set of measurements.
5. **Core momentum cooling study**
   - Conditions
     - This study requires no stacking and circulating beam in the Accumulator.
   - Study
     - Test the cooling of the 4-8GHz momentum TWTs individually and then together.
     - This study will help determine if it would be worth while to consider adding an additional 4-8GHz momentum cooling tank during a future shutdown.
     - The studier is Dave Vander Meulen.
     - Estimated time without stacking is one hour.

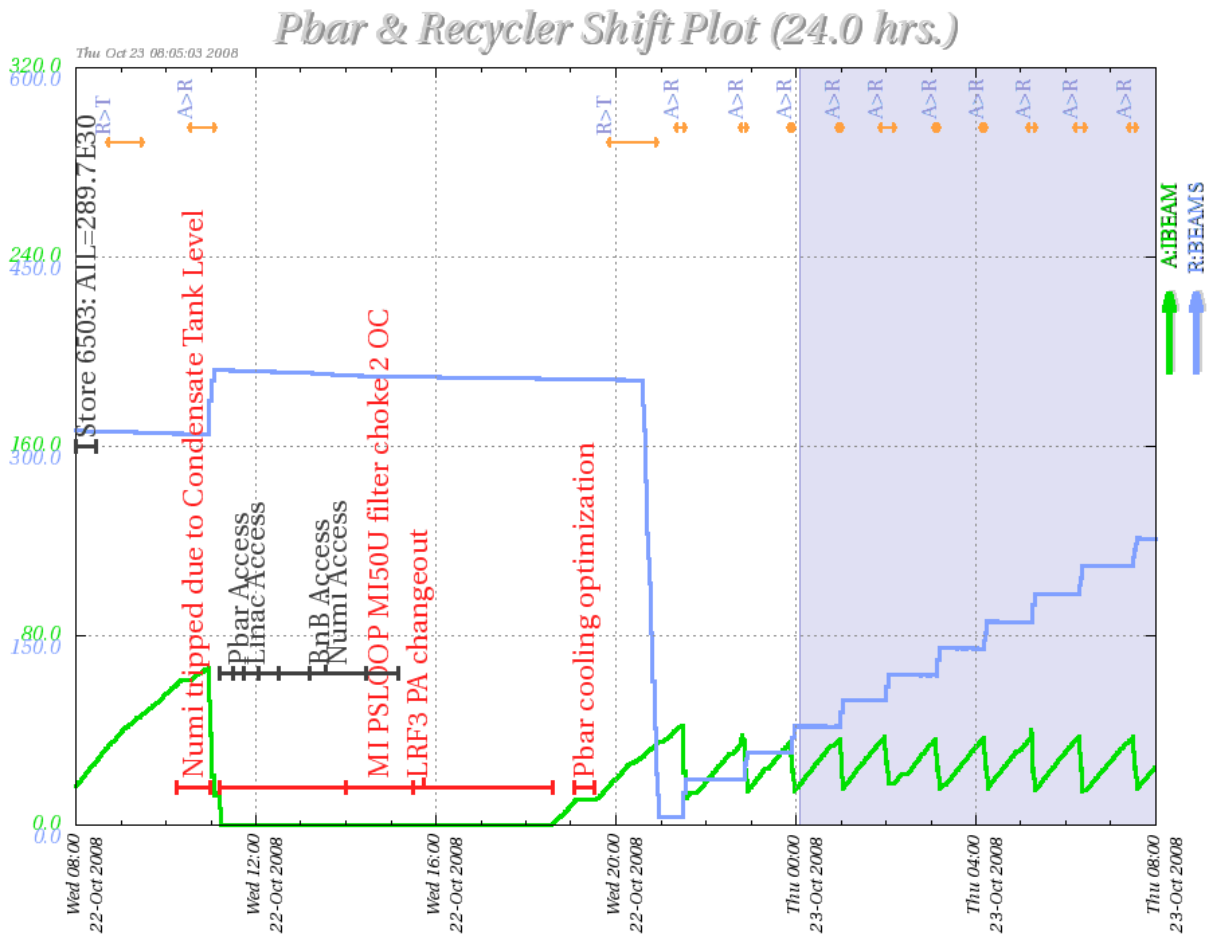
- Estimated time without stacking is one hour.

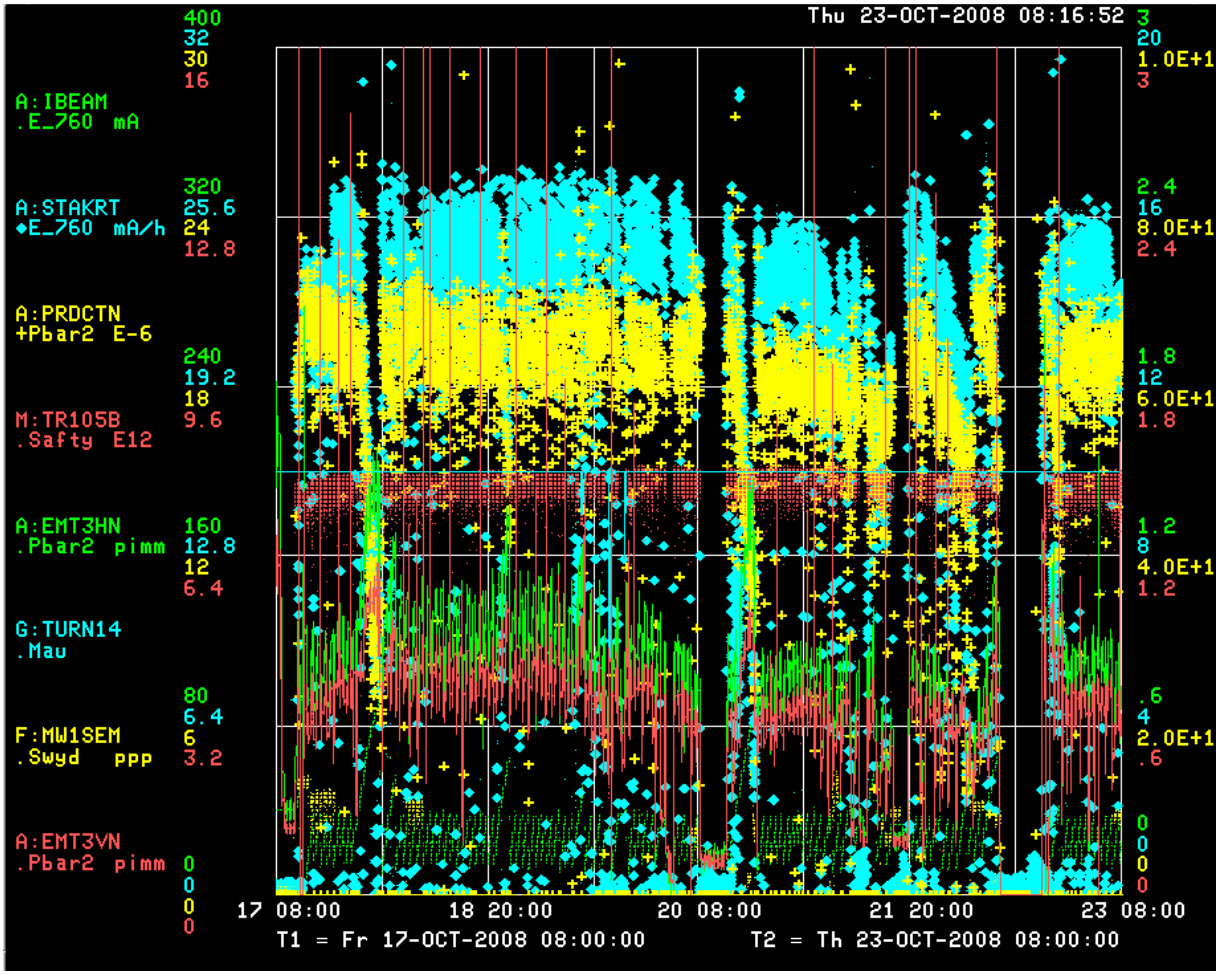
The Numbers

- Paul's Numbers
  - Most in an hour: 22.88 mA at Wed Oct 22 08:57:32 CDT 2008
  - Best: 27.01 mA on 03-Jun-08
  - Average Production 17.41 e-6/proton Best: 25.41 e-6/proton on 01/30/2008
  - Average Protons on Target 6.90 e12 Best: 8.77 e12 on 07/24/2007
  - Largest Stack 66.20 mA Best: 313.58 mA on 02/18/2008
- Al's Numbers
  - Stacking
    - Pbars stacked: 301.06 E10
    - Time stacking: 16.15 Hr
    - Average stacking rate: 18.65 E10/Hr
  - Uptime
    - Number of pulses while in stacking mode: 24621
    - Number of pulses with beam: 22015
    - Fraction of up pulses was: 89.42%
  - The uptime's effect on the stacking numbers
    - Corrected time stacking: 14.44 Hr
    - Possible average stacking rate: 20.85 E10/Hr
    - Could have stacked: 336.70 E10/Hr
  - Recycler Transfers
    - Pbars sent to the Recycler: 295.18 E10
    - Number of transfers : 23
    - Number of transfer sets: 11
    - Average Number of transfer per set: 2.09
    - Time taken to shoot including reverse proton tuneup: 00.16 Hr
    - Transfer efficiency: 94.55%
  - Other Info
    - Average POT : 7.67 E12
    - Average production: 17.82 pbars/E6 protons

    * Red indicates a problem during data retrieval. See the message window for details.
  -

Other


Pbar & Recycler Shift Plot (24.0 hrs.)
Thu Oct 23 08:05:03 2008
Store 6503: AIL=289.7E30
Numi tripped due to Condensate Tank Level
Pbar Access
Linac Access
RnB Access
Numi Access
MI PSLOOP MI50U filter choke 2 OC
LRF3 PA changeout
Pbar cooling optimization
R>T
A>R
A:IBEAM
R:BEAMS
320.0
600.0
240.0
450.0
160.0
300.0
80.0
150.0
0.0
0.0
Wed 08:00 22-Oct 2008
Wed 12:00 22-Oct 2008
Wed 16:00 22-Oct 2008
Wed 20:00 22-Oct 2008
Thu 00:00 23-Oct 2008
Thu 04:00 23-Oct 2008
Thu 08:00 23-Oct 2008


Thu 23-OCT-2008 08:16:52
A:IBEAM
.E_760 mA
A:STAKRT
◆E_760 mA/h
A:PRDCTN
+Pbar2 E-6
M:TR105B
.Safty E12
A:EMT3HN
.Pbar2 pimm
G:TURN14
.Mau
F:MW1SEM
.Swyd ppp
A:EMT3VN
.Pbar2 pimm
400
32
30
16
320
25.6
24
12.8
240
19.2
18
9.6
160
12.8
12
6.4
80
6.4
6
3.2
0
0
0
0
3
20
1.0E+1
3
2.4
16
8.0E+1
2.4
1.8
12
6.0E+1
1.8
1.2
8
4.0E+1
1.2
.6
4
2.0E+1
.6
0
0
0
0
17 08:00
18 20:00
20 08:00
21 20:00
23 08:00
T1 = Fr 17-OCT-2008 08:00:00
T2 = Th 23-OCT-2008 08:00:00